

SKOVRONSKAYA, Alevtina Yevgen'yevna; STEPANOV, Nikolay Dmitriyevich;
YAMPOL'SKAYA, I.G., red.; BAGINA, V.Ya., tekhn. red.

[Weather and crops] Pogoda i posevy. Cheliabinsk, Cheliabinskoe
knizhnoe izd-vo, 1962. 102 p. (MIRA 16:1)
(Chelyabinsk Province--Crops and climate)

STEFANOV, N.D.

Dissemination of agrometeorological information. Meteor. i
gidrol. no.10:44 0 '62. (MIRA 15:9)
(Meteorology, Agricultural)

USHENINA, N.H.; STEPANOV, N.D.

Observation on soil moisture. Meteor. i gidrol. no. 8:43 Ag '62
(MIRA 17:8)

1. Ural'skoye upravleniye gidrometeorologicheskoy sluzhby.

SECRET

PHASE I BOOK DEVELOPMENT

SOV/S055

Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh. M., 1958.

Gidrodinamicheskaya teoriya snazki. Oporty skol'zheniya. Snazka i mazochivnye materialy (Hydrodynamic Theory of Lubrication. Slip Bearings. Lubrication and Lubricant Materials) Moscow, Izd-vo AN SSSR, 322 p. Ekrana 21p inserted. 3,800 copies printed. (Series: Itsi; Trudy, v. 3)

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya. Resp. Eds. for the Section Hydrodynamic Theory of Lubrication and Slip Bearings: A. K. D'yachkov, Professor, Doctor of Technical Sciences; Resp. Ed. for the Section, Lubrication and Oil Chemicals: G. V. Vinogradov, Professor, Doctor of Chemical Sciences; Ed. of Publishing House: M. Ya. Aifanov; Tech. Ed.: O. M. Ous'kova.

FOURTH: This collection of articles is intended for practicing engineers and research scientists.

COMMENT: The collection, published by the Institut mashinovedeniya AN SSSR (Institute of Science of Machines, Academy of Sciences USSR) contains papers presented at the 11th Vsesoyuznaya konferentsiya po treniyu i iznosu v mashinakh (Third All-Union Conference on Friction and Wear in Machines) which was held April 9-15, 1958. Problems discussed were in hydrodynamic theory of lubrication and wear. SOV/S055

Use of Lubricant Materials

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9(2) 001/95-90-2-27/11
 AUTHORS: Alimov, I. I., Podolskiy, A. P.,
 Kutaynikov, A. P., Stetsanov, N. V.

TITLE: Investigation of the Absorption Spectra of the Complexes of
 of Some Elements With Quercetin. Determination of Thorium in
 Monazite-Sand (Izuchenie spektrakh kompleksirovaniya
 nekotorykh elementov s kvercetinom. Opredeleniye
 torgovogo kontenta torgovogo peska)

PERIODICAL: Vestnik Moskovskogo Universiteta, Seriya Khimiya, Mekhanika,
 astronomiya, fizika, khimiya, 1987, No. 1, p. 111-114 (USSR)

ABSTRACT: The authors investigated the absorption spectra of quercetin
 with Th, U, Ti, Fe(II), Fe(III), Co, La, Al, Be,
 Cu(II), Sn(IV). They propose a new photometric method for the
 proof of thorium in monazite sand with quercetin. A former
 paper of A. L. Davydov and V. S. Pevskii [Ref. 1] is used.
 There are 4 figures, 1 table, and 12 references, 6 of which
 are Soviet, 3 American, 3 German, and 2 Czech.

ASSOCIATION: Kafedra analiticheskoy khimii (Chair of Analytic Chemistry)
 SUBMITTED: May 22, 1987

Card 1/1

017158-08-2-00/48

AUTHOR: Dobovina, A. P., Albarin, I. P., Stepanov, N. F.

TITLE: Use of Oxiflavones in Analytical Chemistry (Primeneniya oksiflavonov v analiticheskoj khimii) Photometrical Determination of Titanium by Means of Quercetin (Fotometricheskoe opredeleniye titana kvercetinom)

PERIODICAL: Nauchnye trudy vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1966, No. 2, pp. 285-289 (USSR)

ABSTRACT: The flavones belong to the β -benzopyrone-derivatives. Their oxyderivatives (oxyflavones) form a large group of natural dyes which are found in plants mostly as glucosides. Quercetin, morin, fisetin, and luteolin are mostly found in nature (Refs. 1-5). Synthetic oxyflavones are rarely used because their synthesis is rather complicated (methods: Refs. 9-12). Some properties and constants of the oxyflavones are given. They are white up to yellow crystalline substances which in the course of time oxidize at the air and become brown. Morin and quercetin are described more in detail. In the present paper the authors describe the results obtained by the experimental investigation of quercetin as analytical reagent. Table 1 shows these results.

Card 1/3

SI V 156-1-1-10440

Use of Oxyflavone in Analytical Chemistry. Photometrical Determination of Titanium by Means of Quercetine

The dyeing of quercetine with single elements both in ultra-violet and visible light can be seen from this. Tetravalent titanium forms an intensely brown-red compound with it which can be used for the photometric determination of this element. Figure 1 shows that the maximum of light absorption of this compound is at 425 $m\mu$. Titanium is, however, more properly determined at 440 to 450 $m\mu$, where practically no absorption by the reagent itself takes place. The influence exercised by the pH-value of the medium on the dyeing-intensity was investigated in glycolic- and acetate-buffer solutions. It follows from figure 2 that the optic density of the solution preserves a rather constant value within the range of pH 3.3 to 6.0. The complex begins to decolorize at $pH < 3.3$. The dyeing vanishes almost completely at $pH < 1.0$. At $pH > 6.0$ the optic density increases rapidly since the solution converts from a real one into a colloidal one. At $pH = 9.0$, a red-brown deposit precipitates. The solutions can be stabilized by addition of 20 volumes-% of methanol, ethanol, or acetone. The increase in temperature does not influence the dyeing-intensity. The optic density is maintained for 4 to 6 hours. Ber's law is also applicable within the

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SOV/156-59-2-90/18

Ученые Доклады в Аналитической Химии. Фотометрическое Определение
Илиабуз by Means of Quercetin

range of concentration of from 0.5 to 1.0 μ /ml with the dyed solution (Fig 3). Figure 3 shows that the position of the climax is independent of the length of the wave if a measurement is carried out according to the method of isomolar series. There are 4 figures, 1 table, and 45 references, 3 of which are Soviet.

ASSOCIATION: Katedra analiticheskoj khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of Analytical Chemistry of Moscow State University imeni M. V. Lomonosov)

SUBMITTED: December 6, 1957

Card 3/3

STEPANOV, N.F.; TATEVSKIY, V.M.

Approximate calculation of the π -electron energy of aromatic condensed molecules in the Hückel modification of the Mo Lkao method. Zhur.strukt.khim. 2 no.4:452-455 J1-Ag '61. (MIRA 14:9)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova.
(Hydrocarbons) (Molecules)

STEPANOV, N.F.; TATEVSKIY, V.M.

Establishing a basis of calculating the π -electron energy
bond expansion of aromatic condensed molecules in different
variations of the simplest molecular orbital LCAO method.
Zhur.strukt.khim. 2 no.5:597-603 S-0 '61. (MIRA 14:11)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova.
(Hydrocarbons) (Chemical structure) (Molecules)

STEPANOV, N.F.; TATEVSKIY, V.M.

Substantiation for the decomposition of the π -electron energy of aromatic condensed molecules into bonds in various versions of the simplest molecular orbital method. Vest.Mosk. un. Ser.2:khim. 17 no.1:26-29 Ja-F '62. (MIRA 15:3)

1. Moskovskiy gosudarstvennyy universitet, kafedra fizicheskoy khimii. (Molecules) (Chemistry, Physical and theoretical)

БНОК, Aleksandr Arturovich; ZAUSAYLOV, Boris Alekseyevich; STEPANOV,
Nikolay Grigor'yevich; KOLFUNOVA, M.P., red.; BOBROVA, Ye.N.,
tekhn.red.

[Fundamentals of safety engineering and fire prevention
measures in railroad transportation] Osnovy tekhniki bez-
opasnosti i protivopozharnoi tekhniki na zhelesnodorozhnom
transporte. Moskva, Vses.izdatel'sko-poligr.ob"edinenie M-va
putei soobshchenia, 1960. 234 p.

(MIRA 14:4)

(Railroads--Safety measures)
(Railroads--Fires and fire prevention)

STEPANOV, N.G.; VERINA, G.P., tekhn.red.

[Fire prevention rules in railroad transportation] Pravila
pozharnoi bezopasnosti na zheleznodorozhnom transporte. Moskva,
Gos.transp. zhel-dor.izd-vo, 1958. 230 p. (MIRA 12:2)

1. Russia (1923- U.S.S.R.) Ministerstvo putey soobshcheniya.
Upravleniye voyenizirovannoy okhrany.
(Railroads--Fires and fire prevention)

BOCHAROV, Nikolay Filippovich [deceased]; DEGTAREV, Viktor Olegovich;
KOVALEV, Anatoliy Ivanovich. Primal uchastiye STEPANOV, N.G.;
ZAUSAYLOV, B.A., retsenzent; FEDOROVSKIY, P.Ye., retsenzent;
TSETLIN, B.V., red.; PESKOVA, L.N., red.; BOBROVA, Ye.N., tekhn.
red.

[Fundamentals of safety engineering and fire prevention measures]
Osnovy tekhniki bezopasnosti i protivopozharnoi tekhniki. Moskva,
Transzheldorizdat, 1962. 202 p. (MIRA 16:2)
(Railroads--Safety measures)
(Railroads--Fires and fire prevention)

L 32989-66 EWT(1)/EWT(m)/EWP(j), T/EWP(k) RM
ACC NR: ARG016269 SOURCE CODE: UR/0058/65/000/011/H061/H062
61
13

AUTHOR: Stepanov, N. G.

TITLE: Ultrasound propagation velocity in binary ethyl acetate¹ - acetic acid mixtures

SOURCE: Ref. zh. Fizika, Abs. 11Zh426

REF SOURCE: Sb. Primeneniye ul'traakust. k issled. veshchestva. Vyp. 20, M., 1964, 117-121

TOPIC TAGS: ~~sound speed~~, ultrasound, acetic acid, acetate, temperature dependence, acoustic measurement, *ACOUSTIC SPEED, PROPAGATION VELOCITY*

ABSTRACT: The speed of ultrasound² was measured in ethyl acetate (density 0.900 g/cm³, refractive index 1.3724) and a mixture of ethyl acetate and acetic acid in the temperature interval 10 - 90C. The acetic acid content in the mixtures was 0.3, 1.0, 11.98, and 30 wt.%. The obtained results lead to the following conclusions: 2) the speed of ultrasound in ethyl acetate and in mixtures with small concentrations of acetic acid decreases linearly in the considered temperature interval with increasing temperature; b) the dependence of the speed of sound on the concentration of the acetic acid is weak. The measurements were made by an optical method using a telescopic system. To ensure constancy of the mixture composition during the time of the measurements, the measurement chamber was hermetically sealed. The measurement accuracy was 0.8%. I. Chaban. [Translation of abstract]

SUB CODE: 20

Card 1/1. K

BUZANOV, N.O., prof., doktor tekhn. nauk; STARANOV, N.O., inzh.

Index of one-way classification yards. Zhel. dor. transp. 47 no.2:
198-91 Ag '65. (MIRA 12:9)

ZOLOTOVA-KOSTOMAROVA, M.I., prof.; STEPANOV, N.G.

Blood gas composition in patients with acute myocardial infarct.
Terap. arkh. 30 no.11:3-10 N '58. (MIRA 12:7)

1. Iz kafedry fakul'tetskoy terapii (zav. - prof. M.I. Zolotova-Kostomarova) pedagogicheskogo fakul'teta II Moskovskogo meditsinskogo instituta imeni N.I. Pirogova.
(HEART--INFARCTION) (BLOOD--OXYGEN CONTENT).

STEPANOV, N. G.

Cand Med Sci - (diss) "Gas composition of blood in patients with rheumatic defect of the heart in various stages." Moscow, 1961. 20 pp; (First Moscow Order of Lenin Med Inst imeni I. M. Sechenov); 250 copies; price not given; (KL, 6-61 sup, 240)

SEMEROVICH, N.I., kand. med. nauk; STEPANOV, N.G., kand. med. nauk;
GALIBEGLY, G.A., kand. med. nauk; POROSHIN, K.K., kand. med.
nauk

Some data on the clinical and morphological aspects of Chierli's
disease. Sov. med. 28 no.8:26-31. Ag '65. (MIRA 18:9)

STEPANOV, N.G.

USSR/Electricity - Cables, Submarine

Feb 53

"Laying and Assembly of ~~Underwater~~^{Submarine} Cables," Engr N. G. Stepanov

Elektr. Stroyeniye, No 2, pp 46-48

Discusses procedures, equipment, personnel used in 2 cable-laying operations:

- (1) a 1,500-m, 6-kv cable across river, procedure proposed by Engr S. M. Neyshtut; (2) a 10-km undersea cable. ^{both} (method described for fastening cast-iron protective connector was proposed by Engr V. P. Likhachev)

STEPANOV, N. I., Eng.

Cables, Submarine

Laying and installing cables under water. Elek. sta. 23, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

372/PAA... A...

124-11-12916

Translation from: Referativnyy Zhurnal, Mekhanika, 1957, Nr. 11, p. 90 (USSR)

AUTHOR: Stepanov, N. G.

TITLE: To the Calculation of the Three-Dimensional Seepage in an Earth Dam Equipped with a Core Wall and a Drain and Attached to Permeable Embankments. (K raschetu prostranstvennoy fil'tratsii v zemlyanoy plotine s diafragmoi i drenazhem, primykayushchey k vodopronitsayemym beregam)

PERIODICAL: Tr. Kuibyshevsk. inzh.-stroit. in-t, 1957, Nr. 4, pp 193-198

ABSTRACT: The Author studies the problem of the seepage around an impervious core wall, assuming the embankments to be composed of the same soil as the body of the dam and assuming that the drainage of the downstream slope is carried forward to the core wall. Forchheimer's equation for a two-dimensional, free-surface seepage is solved by means of the method of conformal representation, whereby the solution is obtained in a fairly simple form. A more general solution of an analogous problem in a flow subject to a head was given by Ye. A. Zamarin (Calculation of the motion of the ground water - Raschet dvizheniya gruntovykh vod, Tashkent, 1928). (V. M. Shestakov)

Card 1/1

Bibliography: 5 references.

3. S. I. LUKOV, M.C., Cand Tech Sci--(disc) "Hydraulic studies of filtration
in ~~8~~ ^{dam}-passing ~~anti~~ anti-filtration installations of earth ~~dams~~." Kiev,
1958. 16 pp with drawings (Min of Higher Education UkrSSR. Kiev Order
of Lenin Polytech Inst), 150 copies. (EL, 44-58, 123)

STEPANOV, N.G.; PRUMSON, Yu.V.

Using electric analog net models in calculating the pressure
distribution in a gas pool. Gaz. prom. 9 no.11:9-13 '64.
(MIRA 17:12)

LALENKOV, Vladislav Nikolayevich; KARAKH, A.S., retsenzent;
BARTS. Ye.G., retsenzent; STEPANOV, N.G., otv. red.;
FISHCHENKO, B.V., red.

[Installation of the electrical equipment of industrial
enterprises and systems] Montazh elektrooborudovaniia
promyshlennykh predpriatii i ustanovok. Khar'kov, Izd-
vo Khar'kovskogo univ., 1965. 333 p. (MIRA 18:7)

STEPANOV, N.I., arkhitektor.

Distribution of commercial and servicing enterprises in residential
areas. Gor. khoz. Mosk. 32 no. 7:28-30 J1 '58. (MIRA 11:6)
(Moscow--Shopping centers)

STEPANOV, N.I., arkhitektor

Municipal service systems for new residential districts. Gor. khoz.
Mosk. 35 no.8:7-10 Ag '61. (MIRA 14:8)
(Moscow--Municipal services)

STEPANOV, N.I.

STEPANOV, N.I.

Reclamation of waste lands covered by quack grass. Nauka i pered.
op. v sel'khoz 7 no.10:53 0''57. (MLRA 10:11)

1. Agronom kolkhosa "Krasnyy Oktyabr'."
(Quack grass) (Reclamation of land)

STEPANOV, N.I.; DEHGUN, N.P.; LIBEROV, I.L.

Device for the removal of internal facets or rectangular grooves in piston
rings. Avt.trakt.prom. no.11:30-31 M '53. (MIRA 6:11)
(Piston rings)

STEPANOV, N.I.

Efficiency innovator of the Kovrov excavator plant. Stroil.i dor.
mashinostr.no.1:29-30 Ja '57. (MLRA 10:2)
(Kovrov--Excavating machinery) (Kuftin, A.I.)

STEPANOV, N.I.; POLYANSKIY, S.N.

Innovators at the Kovrov Excavator Plant. Stroi.i dor.mashinostr.
2 no.7:36 J1 '57. (MIRA 10:7)
(Excavating machinery)

34058

3/128/62/003/002/001/007
A004/A127

IP 1100

AUTHORS: Gulyayev, B.B.; Alekseyev, P.Ye.; Kononov, D.R.; Stepanov, N.M.

TITLE: High-strength cast steel of good weldability

PERIODICAL: Liteynoye proizvodstvo, no. 2, 1962, 1 - 4

TEXT: The authors point out that the steel grades 30XHMЛ (30KhMЛ), 30XHBЛ (30KhNVL) and 30ДХСНЛ (30DKhSNL) with σ_s exceeding 50 kg/mm² according to GOCT (GOST) 7832-55 have no good weldability and unsatisfactory casting properties, while the steel grades 10XНДТЛ (10KhNDTL), 13XНДФТЛ (13KhNDFTL) and 08ГДНФЛ (08GDNFL), though of good weldability, are no high-strength steels, with σ_s not exceeding 40 - 45 kg/mm² after heat treatment. Investigations were carried out with compositions containing the following alloying additives: 0.8 - 1.4% Si, 1.2 - 1.4% Mn, 0.8 - 1.5% Cr, 0.8 - 3.0% Ni, 0.2 - 0.3% Mo, 0.5 - 0.8% W, 0.1 - 0.2% V, 0.1 - 0.2% Ti, 0.5 - 2.5% Cu, 1.5 - 1.8% Al, 0.2 - 0.3% Ce. The following scientific workers participated in the development, investigations and introduction of steel grades of good weldability: I.A. Shapranov, P.I. Garkushka, P.Ye. Kovalenko, N.A. Shuvalova and N.I. Smirnova. The authors describe various tests being carried out with specimens of different steels, e.g. 08ГФЛ

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A004/A127

High-strength cast steel of good weldability

(12S3FL) 12CH2ΦЛ(12CN2FL), 12X2HMЛ(12Kh2NML), 12 ДН2ΦЛ(12DN2FL), 12ДЧ2ΦЛ(12DSN2FL) and 12ДГΦЛ(12DGFL), of which the 12S3FL, 12SN2FL and 12DGFL grades had σ_s of less than 50 kg/mm², while the remaining grades ensured $\sigma_s = 50 \cdot 60$ kg/mm² in 100 mm cross sections. Tests on a special device revealed that the mechanical properties of all experimental steel grades near the crystallization temperature were not inferior to the 35Л(35L) grade. The optimum combination of mechanical properties, weldability and technological properties was shown by the grades 12DGFL, 12DN2FL, 12DSN2FL and 12SN2FL, of which a test lot was smelted in a basic electric arc furnace with subsequent casting of components of intricate configuration. Technical data presented in a table show that grade 12DN2FL steel having a good weldability, possessed σ_s of not lower than 55 kg/mm² combined with a high ductility and notch toughness. The authors report on investigations being carried out to establish the most favorable heat treatment conditions for the above-mentioned steel grades, present a number of comparative graphs and tables, and in their conclusion, especially recommend the 12DGFL grade steel of good weldability and the high-strength 12DN2FL grade steel possessing an excellent weldability to be used extensively and to be included in the GOST standard. There are 6 figures and 4 tables.

X

STEPANOV, H.H.

S.P. Krasheninnikov in Siberia. Izv. Vses. geog. ob-va 94 no.3:221-230
Ity-Je '62. (MIRA 15:7)
(Krasheninnikov, Stepan Petrovich, 1711-1755)
(Siberia--Discovery and exploration)

STEPANOV, N.M., inzhener.

Using broken and worn barrel bars. Mash.-shir.prom. 17 no.12:20-21
D '52. (MIRA 10:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zhirov.
(Power presses) (Oil industries--Equipment and supplies)

STEPANOV, N.M., inzhener; PITKEVICH, M.G., inzhener.

Drum grain dryer. Masl.-zhir.prom. 19 no.4:5-7 '54. (MLRA 7:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut shirov (for Stepanov)
2. Rosglavrazshirnaslo (for Pitkevich)
(Drying apparatus)

STEPANOV, N.M., inzh.; LASHKO, L.N., inzh.

Improving the system of wet grist separation in the ND-1000 and
ND-1250 extraction units. Masl.-zhir.prom. 28 no.4:33-54 ap
'62. (MIRA 15:5)

1. Bogatovskiy masloekstraktsionnyy zavod.
(Separators (Machinery)) (Feed water purification)

STEPANOV, N.M., inzh.; LASHKO, L.N., inzh.

Modernization of the ND-1000 oil-extraction line.
Masl.-zhir.prom. 28 no.7:32-33 J1 '62. (MIRA 15:11)

1. Bogatovskiy masloekstraktsionny zavod.
(Bogatov--Oils and fats)

STEPANOV, N. M. [Stepanov, M. M.] (Dnepropetrovsk); TSVETKOV, M. M.
[TSvietkov, M. M.] (Dnepropetrovsk); MANEVICH, L. I.
[Manevych, L. I.] (Dnepropetrovsk)

Stability of cylindrical shells reinforced with ribs. Prikl.
mekh. 9 no.1:59-67 '63. (MIRA 16:4)

(Elastic plates and shells)

DUDNIK, I.F.; SMELY, G.N.; STEPANOV, N.M. (Moscow):

"Some results of experimental investigation of stability of cylindrical shells."

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

STEPANOV, N.M., inzhener

Methods for further improvement of electric central control systems.
Transp. stroi. 5 no.7:26-28 S'55. (MIRA 8:12)
(Railroads--Signaling)

KUT'IN, I.M., kandidat tekhnicheskikh nauk; GOLOVKIN, M.K., inzhener;
STEPANOV, N.M.; RAKITO, E.I., redaktor; KHITROV, P.A., tekhnicheskiy
redaktor

[A guide for the electrician and wireman of the automatic railroad
signal block system] *Rukovodstvo elektromekhaniku i monteru avto-
blokirovki. Izd. 4-oe, perer. i dop. Moskva, Gos. transp. shel-dor.
izd-vo 1956. 303 p. (MLRA 9:11)*

1. Russia (1923- U.S.S.R.) Ministerstvo putey soobshcheniya.
(Railroads--Signaling--Block system)

STEPANOV, N.M.

STEPANOV, N.M., inzh.

New semiautomatic blocking circuits. Avtom., telem. i sviaz' no.12:9-13
D '57. (MIRA 10:12)

(Railroads--Signaling--Block systems)

MEUGASOV, Nikolay Mikhaylovich, dots.; STEPANOV, Nikolay Mikhaylovich,
inzh.; NOVIKOV, Valentin Dmitriyevich, inzh.; RAKITO, E.O., red.;
CHEKMEZEV, N.M., red.; KHITROV, P.A., tekhn.red.

[Planning automatic block systems for railroad transportation]
Proektirovanie avtomaticheskoi blokirovki na zheleznodorozhnom
transporte. Moskva, Gos. transp. zhel-dor. izd-vo, 1958. 347 p.
(MIRA 11:5)

(Railroads--Signaling--Block system)

STEPANOV, N.M.; SOCHIVKO, A.S.

What will be done in 1958. Avtom., telem. i sviaz' 2 no.2:33-34
P '58. (MIRA 11:1)

1. Nachal'nik tekhnicheskogo otdela Giprotranssignalsvyazi (for
Stepanov). 2. Nachal'nik sluzhby signalizatsii i svyazi Moskovsko-
Kursko-Donbasskoy dorogi (for Sochivko).
(Railroads--Signaling)

ST 2 P A M E V, Y M.

12(1): 28(1) PAGE 1 RUK REPRODUCTION 86V/2776

Evrop v shlezemobnoy avtomaticheskoy telemechanike i svyazi; sbornik staty (New Developments in Railroad Automation, Remote Control, and Communications) (Collection of Articles) Moscow, Tranzitkhorizdat, 1979. 198 p. 3,000 copies printed.

Mo. (Title page): E.I. Ryazantsev, Candidate of Technical Sciences, and A.M. Pogoda, Engineer; M. (Inside book): G.I. Murshov, Engineer; Tech. Ed.: G.P. Verina.

REMARK: This collection of articles is intended for engineers and technicians specializing in railroad automatic and remote control and communications.

CONTENT: The articles in this book concern the following problems: the application of automatic control in the electric power supply of automatic block-signaling systems; selection of electric interlocking systems in automatic block-signaling systems of railroad stations; administration of route control systems; administration of systems with a relay-electromechanical system of automatic block signaling; production of track circuits of coded automatic block-signaling systems and telephone subcircuits of overhead communication lines; control of traction currents in the electrified sections of railroads. A radar system for measuring the speed of railroad cars on slopes and a signaling system for shunting are described. Some data are also given from non-Soviet railroads in the United States. There are no references.

99

Mo. (Title page): E.I. Ryazantsev, Candidate of Technical Sciences, and A.M. Pogoda, Engineer. Relay-Electromechanical System of Semiautomatic Block-Signaling. The author describes a system of semiautomatic block signals called 'valy-avtomaticheskaya' which was developed in 1966-1977 at the Diprotransmashavtomat and which was found to work satisfactorily on a few lines.

78

Kryzhanovskiy, I.A., Engineer. Remote Lever System in Route Control Systems. The author is of the opinion that the route-control system of Engineers Bitalerich and Balyger, widely used in the USSR, applies only to small railroad stations. This system is not suitable for use on lines with a route lever system developed which can handle both incoming and outgoing trains from all routes and in all directions. Operation of this system for a period of five years gave satisfactory results. A description of the system is given.

89

Prokhorov, V.I., and Ye.S. Ryzhikov, Engineers. Remote Control Systems of the Signaling Type. The Design Office of the Main Administration of Signaling and Communications of the Ministry of Transport in 1977 developed a new system of route control. This system consists of standard switch-locking arrangements (with route and signal control locks) and control lever equipment. The authors describe the system in detail.

102

Balyger, A.M., Engineer. Signaling System on Railway Lines. The author describes the two-segment signaling system used in the Moscow and Leningrad suburbs.

115

Shenik, A.I., Engineer. Radar Device for Measuring Speed. In 1971 the Diprotransmashavtomat system started the development of a system of automatic speed regulation of railroads in long yards. In 1977 experimental models of an electronic speedometer of the KSP-1 type and of a radar meter of the KSP-1 type were developed and tested under operating conditions. The author describes these devices, which were built on the Doppler-effect principle.

130

Pol'yanin, A.S., Engineer. New Data on the Effect of the Contact Wire Network of B-3 Electric Railroads on Telephone Circuits of Overhead Communication Lines. At the XVII 1979 studies of the causes of the disturbing effects of A-4 contact wire currents on long-distance service channels are being conducted, and the author describes the progress of these disturbances are planned. The author describes the initial results of this investigation.

147

Radzikh, J.M., Candidate of Technical Sciences. Development of Automatic and Remote Control on Railroads in the USSR. This is a descriptive article of improvements in the USSR in the above field during the last 3 to 5 years.

173

Pogoda, A.M., Engineer. Communications on Railroads in the USSR. This is a descriptive article on the various types of communications systems on railroads in the USSR.

STEPANOV, N.M.

Means for improving the operation of blocking hand generators.
Avtom.telen.i svias' 3 no.10:40-41 O '59. (MIRA 13:2)

1. Nachal'nik tekhnicheskogo otdela Oiprotranssignalevyazi.
(Railroads--Electric equipment) (Dynamos)

STEPANOV, M.M., inzh.

Experience in using block electric interlocking. Transp.stroi.
9 no.3:19-22 Mr '59. (MIA 12:4)
(Railroads--Signaling)

STEPANOV, N.H., inzh.

Principal networks and engineering efficiency indices of relay-type
semiautomatic block systems. Avtom., telem. i sviaz' 5 no.11:13-17
N '61. (MLRA 14:11)

(Railroads--Signaling--Block system)

STEPANOV, N.M., inzh.

Linking-up semiautomatic relay block systems with the route
controlling devices of the Natalevich system. Avtom., telem.1
sviaz' 6 no.1:5-8 Ja '62. (MIRA 15:3)
(Railroads—Signaling—Block system)
(Railroads—Signaling—Interlocking systems)

STEPANOV, N.M.; VASIL'TSOV, A.M.; ZHIGIS, S.Yu., inzh.,
retsensent; MARENKOVA, G.I., inzh., red.; VOROTNIKOVA,
L.F., tekhn. red.

[RPB and BPLTs semiautomatic block systems] Sistemy pu-
tevoi poluavtomaticheskoi blokirovki RPB i BPLTs. Mo-
skva, Transzheldorizdat, 1963. 182 p. (MIRA 16:10)
(Railroads--Signaling--Block system)

STEPANOV, N.M.

Choice of a relay and calculation of power supply for the line circuit of a semiautomatic relay block system. Avtom., telem. i sviaz' 7 no.5:9-13 My '63. (MIRA 16:7)

1. Nachal'nik tekhnicheskogo otdela Giprotranssignalsvyazi. (Railroads--Signaling--Block system)

STEPANOV, N.M.

Use heaters for diesel engines. Stroi. truboprov. no.9:29-30
S '64. (MIRA 17:10)

1. Trest Nefteprovodmontazh, Ufa.

STEPANOV, M.N., Cand Tech Sci -- (diss) "Increasing the effectiveness of conic suction pipes ~~for~~ water turbines." Odessa, 1959, 14 pp (Min of Higher Education UkSSR. Odessa Engineering Construction Inst) 150 copies (KL, 28-59, 128)

- 77 -

ARGUNOV, P.P., prof.; STEPANOV, N.N., inzh.; GLADOVICH, G.U., inzh.

Turbine block with ejection from a conical suction pipe with an internal cone insert. Izv. vys. ucheb. zav.; energ. 3 no.11:100-104 N '60. (MIRA 13:12)

1. Odesskiy inzhenerno-stroitel'nyy institut. Predstavlena kafedroy ispol'zovaniya vodnoy energii.
(Hydroelectric power stations)

SECRETARY, ILL

BEBURISHVILI, Ye.M.; YUSIN, V.A., professor, direktor; STEPANOV, N.N., professor,
nauchnyy rukovoditel'.

Variations of the enteric bacilli in dysentery in children (author's abstract).
Zhur.mikrobiol.epid.i immun. no.7:73 J1 '53. (MLBA 6:9)

1. Turkmenskiy institut epidemiologii i mikrobiologii. (Dysentery)

STEPANOV, N.N.

The first Russian expedition to the coastal region of the Sea of
Okhotsk. Izv.Vses.geog.ob-va 90 no.5:438-452 S-O '58.

(MIRA 11:11)

(Okhotsk region--Description and travel)

STEPANOV, NIKOLAY NIKOLAYEVICH

N/5
623.12
.58

Inzhenernaya Geodeziya (Engineering Geodesy) Moskva, Izd-vo Narkomkhoza
RSFSR, 1943.

327 p. Illus, Diagr., Tables.

AB 516511.

At Head of Title: Vyssheye Inzhenerno-Tekhnicheskoye Uchilishche V.F.

STEPANOV, N. N.

"Additional Tables for Carrying Out Essential Geodetic Work in Cities," bk., Moscow, 1950.

~~STEPANOV~~, Nikolay Nikolayevich, professor; KORSHAK, F.A., redaktor;
SOLOVYCHIK, A.A., tekhnicheskiy redaktor

[Geodesy] Geodesia. Leningrad, Gidrometeorologicheskoe izd-vo, 1954.
343 p. [Microfilm] (MLRA 8:3)
(Geodesy)

SHCHAVELEV, Aleksey Fedorovich, kandidat tekhnicheskikh nauk; STEPANOV, N.N.,
redaktor; VOLCHOK, K.M., tekhnicheskiiy redaktor

[Geodesy] Geodeziia. Leningrad, Izd-vo "Rechnoi transport," Lenin-
gradskoe otd-nie, 1956. 280 p. (MLRA 9:11)
(Geodesy)

STEPANOV, H.H.

Glafir 'akar'evna Vasilevich, 1895- ; on her 70th birthday.
Izv. 'ses. geog. ob-va 97 no.4:380-381 J1-Ag '65.

(MIRA 18:8)

ACC NR: AP6030000

SOURCE CODE: UR/0256/66/000/008/0024/0028

AUTHOR: Stepanov, N. N. (Engineer; Lieutenant colonel; Candidate of technical sciences)

ORG: none

TITLE: Changing the range of permissible flight velocities with altitude

SOURCE: Vestnik protivovozdushnoy oborony, no. 8, 1966, 24-28

TOPIC TAGS: flight mechanics, supersonic aircraft, aircraft performance

ABSTRACT: The flight speed permissible at a given altitude ranges from the lowest to the highest permissible speeds attained during horizontal flight. The lowest permissible speed is determined either by the angle of incidence during horizontal flight, by the stability of engine operation (especially at boosted levels), or by the ability to use armament or equipment. The maximum permissible speed is defined either by the dynamic head or by the Mach number. However, due to the greater compression of the air at higher altitudes the speed indicators tend to show a higher than actual speed. This error increases with altitude, producing the effect that the range of permissible flight speeds changes with altitude. Actually, for supersonic aircraft the range of permissible

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ACC NR: AP6030000

speeds in horizontal flight increases with altitude up to 11—13 km; at greater altitudes this range decreases, since the minimum permissible speed increases while the maximum permissible speed remains constant. Orig. art. has: 4 figures and 3 formulas.

SUB CODE: 01/ SUBM DATE: none

Card 2/2

ACC NR: AP6030000

SOURCE CODE: UR/0256/66/000/008/0024/0028

AUTHOR: Stepanov, N. N. (Engineer; Lieutenant colonel; Candidate of technical sciences)

ORG: none

TITLE: Changing the range of permissible flight velocities with altitude

SOURCE: Vestnik protivovozdushnoy oborony, no. 8, 1966, 24-28

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ABSTRACT: The flight speed permissible at a given altitude ranges from the lowest to the highest permissible speeds attained during horizontal flight. The lowest permissible speed is determined either by the angle of incidence during horizontal flight, by the stability of engine operation (especially at boosted levels), or by the ability to use armament or equipment. The maximum permissible speed is defined either by the dynamic head or by the Mach number. However, due to the greater compression of the air at higher altitudes the speed indicators tend to show a higher than actual speed. This error increases with altitude, producing the effect that the range of permissible flight speeds changes with altitude. Actually, for supersonic aircraft the range of permissible

Card 1/2

1947, No. 1. (Sov. Tech. Sci.)

Dissertation: "Influence of Using Single-phase Transformers in the Lines with Low Load Density." General Dept. of Mechanization and Electrification of Agriculture Inst V. M. Molotov, 20 Jun 47.

CC: Vechernyaya Moskva, Jun, 1947 (Project #17236)

110-9-3/23

AUTHOR: Butayev, F.I., Klimov, N.S., Sakovich, A.A. and Stepanov, N.P.,
Candidates of Technical Sciences.

TITLE: High-voltage Rectifiers/Inverters for Direct Current Power
Transmission. (Vysokovol'tnyye preobrazovateli dlya pere-
dachi energii postoyannym tokom)

PERIODICAL: Vestnik Elektromyashlenosti, 1957, Vol. 28, No. 9,
pp. 8 - 14 (USSR)

ABSTRACT: Brief reviews of the main stages of development of high-
power, high-voltage mercury valves at the All-Union Thermo-
technical Institute. The first stage concerns the Kashira-
Moscow experimental transmission line. The second stage includes
high-voltage valves of intermediate power and the production of
single experimental installations. The third stage concerns
high-power, high-voltage valves suitable for practical high-
voltage d.c. transmission systems. High-voltage rectifiers
have been under development at the All-Union Thermo-technical
Institute since 1935. A number of the principles then evolved,
including single-anode construction, a sectionalised anode system,
and oil-cooling, are still used. German experience with d.c.
transmission was notable for the fruitful work, directed by
G. Dobke, on the development of mercury-arc rectifiers for 150 A
Card1/5 max. and 120 kV max. Joint work with the Scientific Research

110-9-3/23

High-voltage Rectifiers/Inverters for Direct Current Power Transmission.

Institute for Direct Current (NIIPT) using the Kashira-Moscow experimental transmission line, showed that equipment for d.c. power transmission should be considered as a complex whole. In this experimental system, great difficulties were encountered as a result of instability of valve characteristics and a number of specific properties of high-power, high-voltage, rectifier circuits. The valves are subject to back-fire, break-down, loss of control action of the grids, loss of excitation, flashover of anode insulators, and over-voltages on the auxiliary electrodes. There were also difficulties arising from system disturbances such as over-voltages, high-frequency oscillations and current surges. For example on the Stalingrad-Donbas line, where the normal voltage on a valve should be 65 kV, calculations show that during over-voltages it may reach 250 kV. Considerable difficulties arose as a result of free oscillations which appeared in the circuit during ignition and extinction of a valve. High-frequency oscillations, which caused severe radio-interference and damage to the anodes were suppressed by special reactors. Low-frequency oscillations were more difficult to suppress, and damper circuits consisting of capacitance and resistance are being used for this purpose. At first, the Kashira-Moscow line operated with one bridge having three series valves in each arm

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110-9-3/23

High-voltage Rectifiers/Inverters for Direct Current Power Transmission.

and later with two bridge circuits connected in series, one having one valve per arm and the other two. In designing the Stalin-grad-Donbas line, it is proposed to use a sub-station circuit consisting of eight bridge circuits in series, each for a voltage of 100 kV and a current of 900 A. In all, there will be 192 valves working as converters and 32 "shunting" valves. At full load, each valve will handle a power of 7.5 MW. A serious problem was the control of individual circuits from the auxiliary supply panel which was solved under the guidance of Candidate of Technical Sciences I.L. Rubinshteyn. Control is effected by means of a light ray acting on photo-resistance cells which operate relays. For development work, the All-Union Electro-technical Institute (VEI) has constructed equipment for making static tests at up to 200 kV r.m.s., surge generators and a high-power equivalent for testing valves under rated conditions. A large test installation with a transformer group of 120 MW has been constructed at one sub-station. Questions of valve design are then discussed. A sectional drawing of a high-voltage valve is shown in Fig.1. The distinctive feature of high-voltage valves is the anode system and different methods of sectionalising the anodes are shown in Fig.2. It is usually advisable to extend anode sectionalisation to the discharge space, and different types of screens are shown

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110-9-3/23

High-voltage Rectifiers/Inverters for Direct Current Power Transmission.

in Fig.3. Other anode constructions are shown in Fig.4; Fig.4zh shows an anode design developed by V.D. Andreyev. Several types of valves developed in the All-Union Electro-technical Institute are illustrated in Fig.5 (photos). The main relationships of voltage division between the intermediate electrodes of the anode assembly were established during the investigations of high-voltage valves. When the valve works as a rectifier, the negative voltage drop occurs mainly in the gap between the anode and the first anode insert. When working as an inverter the positive blocking voltage lies very largely in the space between the insert furthest from the anode and the upper grid. Development of rectifiers proceeded alongside theoretical and physical investigations, of valve strength, current distribution in the anode, and voltage distribution in the anode assembly, ignition effects, effects during failure of operation and during heavy overloads. In the investigation of physical effects, probe methods of vapour density measurement were very useful. Graphs of the probability of back-fire for the valves BP-1 and BP-3 as functions of cooling temperature are shown in Fig.6. Laboratory results have been confirmed by data of 12 000 hours tests on valve type BP-3 in the experimental transmission line.

Card4/5 Valves type BP-4/2 and BP-9/3 are intended for the Stalingrad-

110-9-3/23

High-Voltage Rectifiers/Inverters for Direct Current Power Transmission.

Donbas transmission line and have passed a wide variety of laboratory tests and the results of the first high-power tests confirm the satisfactory operation of the valves in approximately their normal working conditions. In the light of the experience gained, development is likely to comprise: valves of greater power for higher voltages and currents, which will be combined with improvement in manufacture to improve reliability; valve designs which will ensure great vacuum-tightness, enabling the manufacture of pumpless valves or, if necessary, to provide internal devices to maintain and restore vacuum. Two new types of pumpless valve are shown in Fig.7, one for 150 A max. and the other for 900 A max. with reverse voltages of the order of 100 - 120 kV max. There are 7 figures and 5 Slavic references.

ASSOCIATION: All-Union Electrotechnical Institute (VEI)

SUBMITTED: April 23, 1957.

AVAILABLE: Library of Congress.

Card 5/5

STEFANOV, N.P.

Gas networks in 70 Gomel' streets. Stroi. truboprov. 6 no.6:
22-23 Je '61. (MIRA 14:7)

1. Trest Santekhmontazh, g. Gomel'.
(Gomel'—Gas pipes)

KREYMER, M.I.; BORZENKO, V.A.; BIKTIMIROV, F.S.; STEFANOV, N.P.

Certain data on the industrial evaluation of the efficiency of a
sieve plate with a baffle arrangement. Trudy BashNII NP no.6:
217-225 '63. (MIRA 17:5)

BOGDANOV, V.N.; LEFITSKIY, A.M.; RUSSEYAN, S.V.; SVERDLOV, V.I.;
STEPANOV, N.P.; VYSHEMIRSKIY, M.M., inzh., retsenzent

[Design of fully mechanized automated iron foundries] Pro-
ektirovanie kompleksno mekhanizirovannykh i avtomatizirovan-
nykh chugunoliteinykh tsekhov. Pod red. S.V.Russiana.
Moskva, Mashinostroyeniye, 1964. 322 p. (MIRA 17:10)

GRACHEV, A.M.; KLYARFEL'D, B.N.; STEPANOV, N.P.

Discharge current distribution along the cross section of a
large gas-discharge device. Elektrichestvo no.5:28-33 My '64.
(MIRA 17:6)

1. Vsesoyuznyy ordena Lenina elektrotekhnicheskiy institut
imeni V.I. Lenina.

L 23770-66 EWA(h)/EWT(1)

ACC NR: AP6015276

SOURCE CODE: UR/0292/65/000/0:1/0022/0024

AUTHOR: Butayev, F. I. (Candidate of technical sciences); Klimov, N. S. (Candidate of technical sciences); Pertsev, A. A. (Engineer); Stepanov, N. P. (Candidate of technical sciences)

ORG: none

TITLE: Developments in high-voltage power rectifiers 25

SOURCE: Elektrotehnika, no. 11, 1965, 22-24

TOPIC TAGS: direct current, electric power transmission, mercury rectifier

ABSTRACT: The Leningrad-Donbass transmission line is presently being put into operation. This will be the most powerful d-c transmission line in the world, sending 750 Mw of power at 800 kv over a distance of roughly 500 km. The transmission system uses a three-phase eight-bridge network with power rectifiers which operate at a maximum voltage of 130 kv and a maximum current of 900 amps. The eight-bridge system, proposed by the All-Union "Order of Lenin" Electrical Engineering Institute imeni V. I. Lenin, has the following advantages over the four-bridge circuit: 1) when individual bridges in the system fail, the transmitted power is maintained by current overload on the bridges remaining in operation; 2) the work load on the equipment is lighter in emergency conditions, and two rectifiers can be series-connected in each arm of the bridge to reduce the work load by increasing the number of rectifiers from

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UDC: 621.314.65.001.8

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ACC NR: AP6015276

72 to 96; 3) when separate rectifiers fail, the voltage applied to the elements remaining in operation does not exceed the nominal value, while in the four-bridge system the voltage is twice the rated value in this type of emergency. Various foreign high-voltage d-c transmission lines now in operation and being planned are mentioned and their parameters are given. Some of the advances made in high-voltage power rectifiers since 1940 are discussed. Work was begun on the rectifier being used in the Volgograd-Donbass system in 1952 at the All-Union Electrical Engineering Institute. The various problems involved in the development and construction of this device are discussed. This single-anode pool unit, called the VR-9 Excitron, is now being mass-produced at a specially built factory in Moscow. The overall dimensions of the rectifier are 1.9 x 1.2 x 3.4 m. A comparison of the VR-9 Excitron with the Swedish-made rectifiers used in the English Charnel d-c Transmission line shows that the Soviet high-power mercury rectifier is up to modern requirements with respect to electrical characteristics and construction. Orig. art. has: 2 figures. [JPRS]

SUB CODE: 10, 09 / SUEM DATE: none / ORIG REF: 002 / OTH REF: 002

Card 2/2 *JRS*

STEPANOV, N. S.

"Results Obtained by Crossing 'Mikhnov' and 'Romnimarsh' Sheep,
and Breeding Work With the Hybrids." Cand Agr Sci, All-Union Sci
Res Inst of Animal Husbandry, Ostrogozhsk, 1953. (RZhBiol, No 4, Oct 54)

Survey of Scientific and Technical Dissertations Defended at USSR
Higher Educational Institutions (10)

So: Sum. No. 1181, 5 May 55

STEPANOV, H.S. zasluzhennyy vrach Yakutskoy ASSR.

Epidemic shifts in tuberculosis of the peripheral lymph nodes
in the Yakutian A.S.S.R. Vop. epid. i klin. tub. 5:33-36 '58.
(MIRA 14:12)

(YAKUTIA--LYMPHATICS--TUBERCULOSIS)

STEPANOV, N.S.

Track supervisor Chibizova. Put' 1 put.khoz. 5 no.4:11 Ap '61.
(MIRA 14:7)

1. Inspektor po kadram, st. Kanash, Kazanskoy dorogi.
(Railroads—Employees)

STEPANOV, N.S.

Foliar feeding with urea increases the protein content of spring
wheat. Zemledelie 25 no.5:58-59 My '63. (MIRA 16:7)

1. Ul'yanovskiy sel'skokhozyaystvennyy institut.
(Wheat) (Urea)

06182

SOV/141-1-5-6-26/28

AUTHORS: Averkov, S.I. and Stepanov, N.S.

TITLE: Increasing the Gain of a Travelling-wave Tube in the Transient Regime

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1958, Vol 1, Nr 5-6, pp 184 - 185 (USSR)

ABSTRACT: The transient operation of a travelling-wave tube has been little studied and it seemed possible to be able to increase the gain under non-stationary conditions. In the arrangement of Figure 1, a type RT-10 10-cm pulse generator feeds the travelling-wave tube and triggers, after a variable time delay, the video pulse oscillator. The latter applies a pulse to the focusing electrode of the travelling-wave tube via the voltage divider R and capacitors C_1 and C_2 . Figure 2 shows oscillograms of collector and second anode (helix) currents. The upper curve is somewhat blurred by 50 c.p.s. pick-up and shows the collector current J which is the same in each case. The lower curves show the output current for various values of time delay and fixed input to the helix. Figure 3 shows the operation of the tube. The

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Increasing the Gain of a Travelling-wave Tube in the Transient Regime

gain K depends on the magnitude and sign of dJ/dt . It is greater than the stationary value K_0 when the derivative is positive and less when it is negative. The effect is independent of operating frequency but falls off with larger inputs. For an actual increase in collector current of only 20% the gain may be temporarily increased by a factor of 6. There are 3 figures.

ASSOCIATION: Issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Radiophysics Research Institute of Gor'kiy University)

SUBMITTED: September 20, 1958

Card 2/2

А. В. Малахов

Метод расчета излучения антенн без элементов конфигурации и числа элементов антенны

В. О. Голицын

Шероховатые поверхности антенны как и организована конструкция

А. А. Арсеньев

Расчет волноводной системы антенны с трансформационным фильтром

Р. Г. Воронин

Расчет антенны сферической радиационной системы

19 июня
(с 10 до 16 часов)

С. В. Андреев

Н. С. Степанов

Распространение волн в системе с бегущим паразитом

20

А. И. Фоминский

А. Р. Яков

Опыт и перспективы квантовых антенн антенны СВЧ диапазона

В. В. Григорьев

Общая теория антенн радиочастотного диапазона

А. Г. Калитинский

Вопросы повышения эффективности антенн в области радиочастотного диапазона

19 июня
(с 18 до 22 часов)

А. В. Савин

Практические вопросы антенно-линейных систем

А. Т. Ким

Вопросы теории антенно-линейных систем на миллиметровом диапазоне

В. А. Фурманов

Исследования характеристик антенно-линейных систем радиочастотного диапазона

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications in. A. G. Popov (1859-1944), Moscow, 6-18 June, 1959

05483

SOV/141-2-2-8/22

AUTHORS: Averkov, S.I. and Stepanov, N.S.
TITLE: Wave Propagation in the System with a Travelling Parameter
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika,
1959, Vol 2, Nr 2, pp 203 - 212 (USSR)
ABSTRACT: An exact analysis of the wave propagation, even in comparatively simple systems with variable parameters, presents considerable mathematical difficulties (S.I. Averkov and Ostrovskiy, L.A. - Ref 4). Thus, for a long line having characteristic parameters L and C , which are functions of distance x and time t , the basic relationships can be written as Eqs (1), where V and I denote the voltage and the current in the line. If it is assumed that $L/C = \text{const.}$, Eqs (1) can be written as:

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Wave Propagation in the System with a Travelling Parameter

$$\frac{\partial}{\partial x} (v + \rho I) = - \frac{\partial}{\partial t} \left[\sqrt{LC} (v + \rho I) \right] \quad (2)$$

$$\frac{\partial}{\partial x} (v - \rho I) = \frac{\partial}{\partial t} \left[\sqrt{LC} (v - \rho I) \right]$$

where $\rho = \sqrt{L/C}$. In these equations it will be assumed that the variable is $\sqrt{LC} = n(x,t)$. This function is in the form of:

$$n = n(t - x/a) \quad (4)$$

By introducing the notation of Eqs (5), Eqs (1) or (2) can be written as Eqs (6). If $\eta = t - x/a$, the characteristic equations of the system are written as Eqs (7).

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Wave Propagation in the System with a Travelling Parameter

The solutions of Eqs (6) are therefore in the form of Eq (8), where F_1 and F_2 are arbitrary differentiable functions. The expressions for V and I are, therefore, in the form of Eqs (9), where ξ_1 and ξ_2 are defined by Eqs (10). Further, by introducing the boundary conditions of Eqs (11) and the notation of Eqs (14), Eqs (9) can be written as:

$$V(x,t) = \frac{1}{2} u_1 [t(\xi_1)] \Phi_1(x,t) + \frac{1}{2} u_2 [t(\xi_2)] \Phi_2(x,t); \quad (15)$$

$$I(x,t) = \frac{1}{2\varrho} u_1 [t(\xi_1)] \Phi_1(x,t) - \frac{1}{2\varrho} u_2 [t(\xi_2)] \Phi_2(x,t)$$

where Φ_1 and Φ_2 are determined by Eqs (16). A brief investigation of Eqs (15) shows that if no signal is applied to the input of the line, the system cannot be excited under any conditions. Further, it is seen that there exist two waves propagating in opposite direction; each wave is

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SOV/141-2-2-8/22

Wave Propagation in the System with a Travelling Parameter

expressed by the product of two different functions. The instantaneous frequency in the line is given by:

$$\omega/\omega_0 = \Phi_1(x, t) \quad (22) .$$

Eqs (15) are employed to investigate a particular case, when the parameter n changes in accordance with

$$n(\eta) = n_0(1 + m \cos \Omega \eta) \quad (25) .$$

Here, two cases are possible: for a non-synchronous wave, when $b^2 > c^2$ (see Eq 26), it is found that the function Φ is given by the second equation on p 208, where φ is defined by Eq (27). The dependence of Φ on x is illustrated in Figure 1. For a synchronous wave ($b^2 < c^2$), the function Φ is given by the first equation on p 209, where φ is defined by Eq (29). When $b = 0$, Φ is given by Eq (31) and V is expressed by Eq (33).

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E073/E314

AUTHORS: Averkov, S.I. and Stepanov, N.S.

TITLE: Letter to the Editor

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika,
1960, Vol 3, Nr 2, p 344 (USSR)

ABSTRACT: The above authors point out an error in their article*
published in an earlier issue of this journal
(Radiofizika, Vol 1, Nr 5-6, p 184, 1958). This
error was discovered by G.G. Solodar' (Moscow State
University) who repeated the experiment referred to
by the authors.
There is 1 Soviet reference.

SUBMITTED: February 7, 1960

ASSOCIATION: (Radiophysics Research Institute of Gor'kiy University)

*[Entitled: Increasing the Gain of a Travelling-wave Tube³⁵ in the Transient
Regime]

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9,1400 (also 1006)

AUTHOR: Stepanov, N.S.TITLE: Wave Propagation in a Non-dispersive System with Variable ParametersPERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,
Radiofizika, 1960, Vol. 3, No. 4, pp. 672 - 682

TEXT: The wave propagation in a long line, whose parameters L and C are functions of distance x and time t, is considered. The principal equations for the system are:

$$\frac{\partial V}{\partial x} = -L \frac{\partial I}{\partial t} - \left(R + \frac{\partial L}{\partial t} \right) I ; \quad (1)$$

$$\frac{\partial I}{\partial x} = -C \frac{\partial V}{\partial t} - \left(G + \frac{\partial C}{\partial t} \right) V$$

where V and I represent the voltage and current in the line. New variables defined by Eqs. (2) are introduced.

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Eqs. (1) can therefore be written as Eqs. (3), whose various parameters are defined by Eq. (4). It is assumed that the first integrals of the characteristic equations:

$$dx = dt/n(x,t), \quad dx = - dt/n(x, t)$$

are known and these are denoted by ϵ_1 and ϵ_2 . Further new variables defined by Eq. (5) are introduced, where f_1 and f_2 are given by the first equation on p. 674. Eqs. (3) can now be written as Eqs. (6). This system can be solved by the method of successive approximations. For the zero approximation $m_1 = m_2 = 0$ the solutions are given by Eqs. (7), where F_1 and F_2 are arbitrary functions. The first approximation for the reflected waves is given by Eqs. (8). These waves

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are also reflected and produce second-approximation waves. Consequently, the solution of the problem is in the form of the series expressed by Eqs. (9). If the line is semi-infinite and the boundary conditions are defined by Eqs. (10), the zero approximation is in the form of Eqs. (11), where F_1 and F_2 are given by Eqs. (12). The final solutions for voltage and current are thus expressed by Eq. (13), where K_1 and K_2 are defined on p. 675. First, only the incident wave is considered. The amplitude coefficient K can be represented by:

$$K_1 = \Phi Z S \quad (14)$$

where Φ , Z and S are given by Eqs. (15), (16) and (17), respectively. If the input voltage to the line is in the form defined by Eq. (19), the first voltage component in Eqs. (13) is given by Eq. (20). This can finally be written as:

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Wave Propagation in a Non-dispersive System with Variable Parameters

$$v\left[t\left(\frac{x}{v_1}\right)\right] = V_0 \cos \left\{ \frac{2\omega_0}{\Omega} \left[\text{Arc tg}(e^{-\alpha x} \text{tg}\beta) - \frac{\pi}{4} \right] + \pi_0 \right\} \quad (31)$$

where the various parameters are defined on p. 678. The first reflected wave can be written as Eq. (34). Thus, when a sinusoidal voltage, commencing at $t = 0$ is applied to the line so that the conditions specified by Eqs. (37) are fulfilled, the reflected wave is given by Eq. (39). It is interesting to investigate the spectrum of the voltage at various parts of the line. This is done by using the Fourier series expansion, whose coefficients are in the form of Eq. (44). An example where $v(t) = V_0 \cos \omega_0 t$ is considered; it is assumed that t extends over an interval lying between τ_1 and τ_2 . The parameter n varies linearly in

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accordance with Eq. (47). If $ZS = 1$, the voltage in the line can be expressed by Eq. (48). The spectral components of this voltage are given by Eq. (51). From the above investigation it is concluded that the lines with continuously varying parameters are unstable as amplifiers but can be employed for transforming the shape and the spectrum of the signal. There are 9 references: 4 Soviet and 5 English.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: February 22, 1960

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9.2572 (1144, 1139)

AUTHOR: Stepanov, N.S.

TITLE: Resonance Reflection of Waves in a System with Periodically Varying Parameters

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1961, Vol. 4, No. 4. pp.656 - 664

TEXT: In a previous paper the present author used the method of successive approximations to determine wave-reflection in a long line with periodically varying parameters, the variation being in accordance with the travelling-wave law. This problem is of interest in connection with the parametric amplification of a travelling wave. Previous work (Ref. 1 - the author - this journal, 3, 672, 1960; Ref. 2 - G.M. Roe, M.R. Boyd - Proc. IRE, 47, 1213, 1959 and Ref. 3 - R. Landauer - J. Appl. Phys., 31, 3, 1960) led to the conclusion that the amplification of monochromatic waves in a weakly dispersing system was not possible. However, this conclusion holds only in the absence of reflected waves or at least when the reflected waves can be neglected, i.e. in the region where the

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geometric-optics approximation holds. It is shown in the present paper that under certain conditions amplification and even self-excitation may occur. The problem is formulated as follows. Suppose that at the input of the line ($x = 0$) there is a source of e.m.f. $E(t)$ with an internal impedance $R_i(t)$, while at the output ($x = \ell > 0$) there is a load $R_H(t)$. It then follows that the initial conditions are:

$$V(0, t) = E(t) - R_i I(0, t), \quad V(\ell, t) = R_H I(\ell, t) \quad (3)$$

Following Ref. 1, it is convenient to use the variables $U_1 = V + \rho I$, $U_2 = V - \rho I$. It is considered that in the zero-order approximation there is only the direct wave U_1^0 and $U_2^0 = 0$. In order for this to hold, the source, the line and the load must be matched, i.e.

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$$\rho(0,t) = R_i(t), \quad \rho(l,t) = R_H(t) \quad (4)$$

The boundary conditions then become

$$U_1(0,t) = E(t), \quad U_2(l,t) = 0 \quad (5)$$

The analysis is then continued for the case $n = n(\eta)$,
 $\rho = \rho(\eta)$ where $\eta = t - x/a$, $n = \sqrt{LC}$ and $\rho = \sqrt{L/C}$.
 Assuming that the input signal is monochromatic,
 i.e. $E(t) = E_c \cos(\omega_0 t + \theta_0)$, the zero-order approximation
 is (Ref. 1)

$$U_1^0 = \frac{n[t(\xi_1)] - 1/a}{n(\eta) - 1/a} \sqrt{\frac{\rho(\eta)}{\rho[t(\xi_1)]}} E_0 \cos \theta, \quad \theta = \omega_0 t(\xi_1) + \theta_0 \quad (6)$$

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where $\xi_1(x, t)$ is one of the characteristic variables (first integral of the equation $n dx = dt$) and the function $t(\xi_1)$ is determined from the relation $\xi_1 = \xi_1(0, t)$. In the steady state the Eqs. (5)-(9) of Ref. 1 lead to the following recurrence relations:

$$U_1^{2(k+1)} = e^{f_1} \int_0^x k_{12} e^{-f_1} U_2^{2k+1} dx; \quad U_1^{2(k+1)} = 0 \quad (7)$$

$$U_2^{2k+1} = e^{f_2} \int_l^x k_{21} e^{-f_2} U_1^{2k} dx; \quad U_2^{2k} = 0 \quad (7a)$$

where $e^{f_1} = \sqrt{p}/(n - 1/a)$ and $e^{f_2} = \sqrt{c}/(n + 1/a)$. In the general case, integrals of the form of Eq. (7) are difficult to deal with and hence certain amplifying assumptions

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Resonance Reflection

are necessary. To begin with, it is assumed that

$$n = C_0 \epsilon = n_0 [1 + m \cos(\omega t - \eta)] \quad (8)$$

where $0 \leq m \ll 1$ and

$$\frac{mn_0}{|n_0 \pm 1/a|} \ll 1, \quad \frac{mn_0 \omega_0}{|n_0 - 1/a| \Omega} \ll 1; \quad (9)$$

On this approximation, the first reflected wave is given by

$$U_2^1 = \frac{1}{2} E_0 m \left(n_0 - \frac{1}{a} \right) \Omega \left\{ \frac{\sin [(1/2)(p-q)(l-x)]}{p-q} \sin \theta_1 - \frac{\sin [(1/2)(p+q)(l-x)]}{p+q} \sin \theta_2 \right\} \quad (12)$$

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where

$$p = \Omega(n_0 + 1/a); \quad q = 2\omega_0 n_0;$$

$$\theta_1 = (\omega_0 - \Omega)t - (1/2)\Omega(n_0 - 1/a)x + (1/2)(p - q)t + \theta_0;$$

$$\theta_2 = (\omega_0 + \Omega)t + (1/2)\Omega(n_0 - 1/a)x - (1/2)(p + q)t + \theta_0.$$

Thus, on this approximation the reflected wave contains only harmonics with frequencies $|\omega_0 = \Omega|$ and $\omega_0 + \Omega$ and both components are amplitude- and space-modulated with periods $2\pi/(p - q)$ and $2\pi/(p + q)$. Resonance reflection occurs with $p \pm q = 0$, i.e.

$$\omega_0 = \pm \frac{1}{2} \Omega \left(1 + \frac{1}{an_0} \right) \quad (13).$$

This is illustrated in Fig. 1, which plots the relative amplitude of the reflected wave on the first approximation as a function of x for the following special cases:
and 6/10.